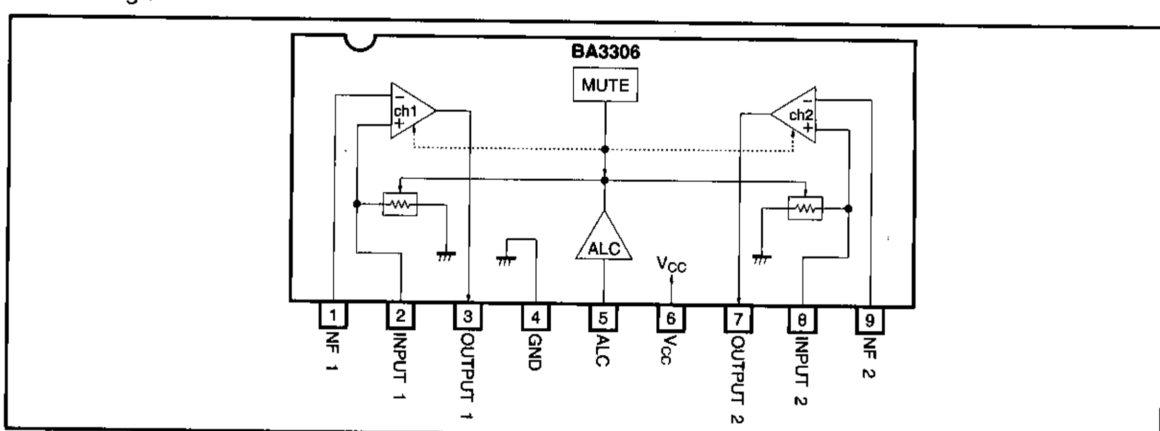
Dual preamplifier with ALC
BA3306

The BA3306 is a dual preamplifier with ALC designed for use in stereo radio-cassette recorders and tape recorders. It comes in a compact 9-pin SIP package and has two record / playback preamplifiers, and an ALC circuit. The preamplifiers have high gain and low distortion, and can be directly coupled to the tape head without coupling capacitors. This prevents tape head magnetization and "pop" noise generation.
The ALC circuit has good channel balance and large dynamic range and can be constructed with addition of just an external detector and time constant circuit.
The IC also includes a power-on mute circuit that suppresses "pop" noise generation.

●Applications
Stereo radio cassette players

●Features
1) Wide operation supply voltage range (V_{CC} = 4.5V to 14V).
2) Low current consumption (I_Q = 2.5mA).
3) High gain (G_{VO} = 80dB).
4) Low distortion (THD = 0.1%).
5) Low noise (V_{NIN} = 1 μV_{rms})
6) Input coupling capacitors and not necessary.
7) Good ALC channel balance.
8) Power-on mute circuit.

●Block diagram



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	Vcc	16	V
Power dissipation	Pd	950*	mW
Operating temperature	Topr	−25~75	°C
Storage temperature	Tstg	−55~125	°C

* Reduced by 9.5mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	4.5	7	14	V

●Electrical characteristics (unless otherwise specified Ta = 25°C, V_{CC} = 7V, and f= 1kHz)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Quiescent circuit current	I_Q	1.5	2.5	4.0	mA	V_{IN}=0V_{rms}	Fig.1
Open-circuit voltage gain	G_{VO}	70	80	—	dB	V_{OUT}=−10dBV	Fig.1
Total harmonic distortion	THD	—	0.1	0.3	%	NAB 34dB, V_{OUT}=40mV_{rms}	Fig.1
Input resistance	R_{IN}	15	25	45	kΩ	—	Fig.1
Maximum output voltage	V_{OM}	0.6	1.2	—	V_{rms}	THD=1%	Fig.1
Input conversion-noise voltage	V_{NIN}	—	1.0	2.0	μV_{rms}	R_g=2.2kΩ, BPF=20Hz~20kHz	Fig.1
ALC Channel balance	△ALC	—	0	2.5	dB	V_{IN}=−60dBV, −30dBV	Fig.1

●Measurement circuit

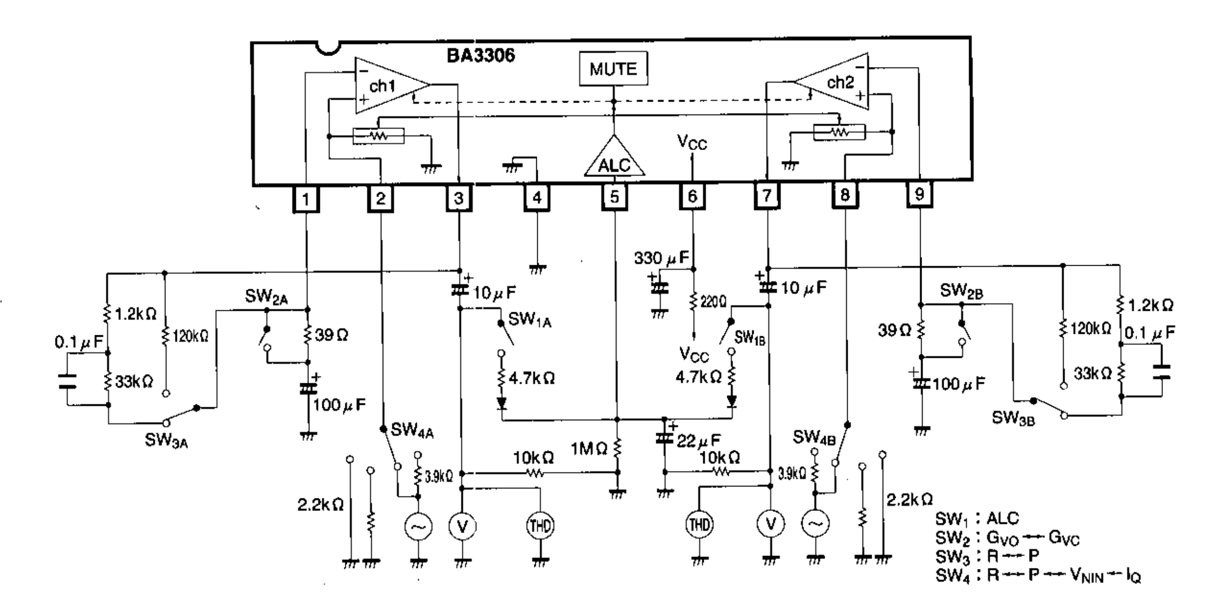


Fig. 1

●Application example

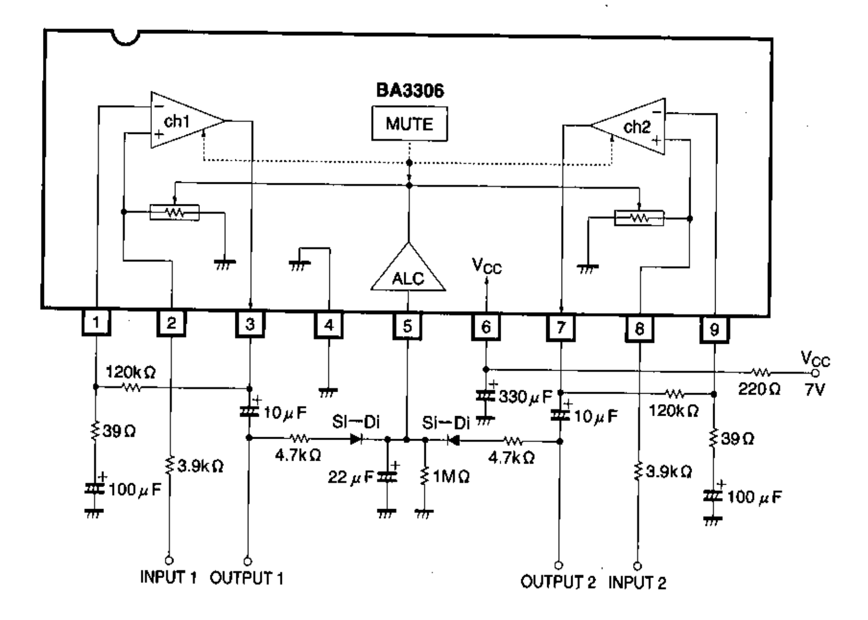


Fig. 2

●Circuit operation

(1) Recording (See Fig. 3)

For recording, insert an attenuation resistor (3.9kΩ recommended) into the input line.

The ALC timing is determined by the time constant of the circuit connected between pin 5 and GND. The attack time is set the capacitor (22 μF) and the resistor (4.7kΩ) that is connected in series with the diode. The recovery time is set by this capacitor and the resistor (1MΩ) connected to pin 5.

(2) Playback (See Fig. 4)

For playback, the amplifier is used as a NAB equalizer amplifier. The ALC circuit is not needed at this time, so pin 5 is earthed. The negative feedback time constant settings are Hi - 120 μs and Lo - 3180 μs.

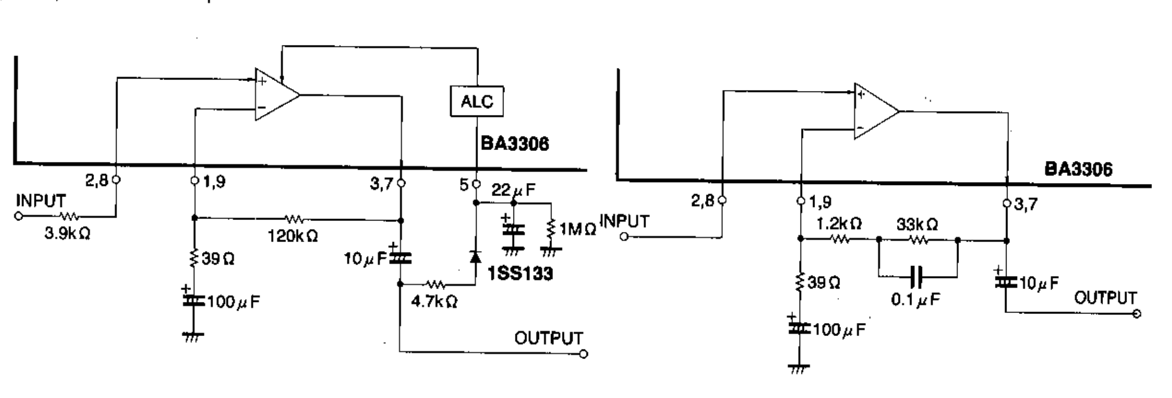


Fig. 3 Fig. 4

Preamplifiers
Low-frequency amplifiers

● Electrical characteristics curves

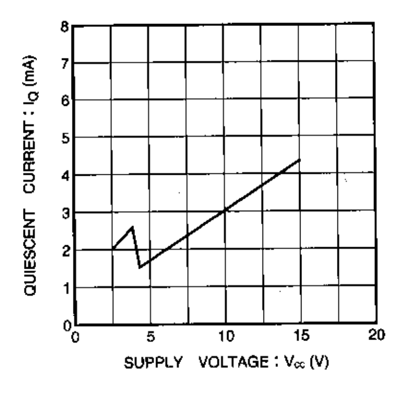


Fig. 5 Quiescent current vs. supply voltage

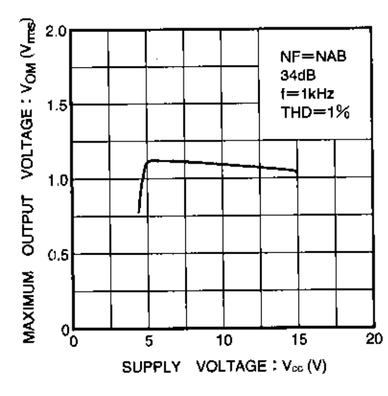


Fig. 6 Maximum output voltage vs. supply voltage

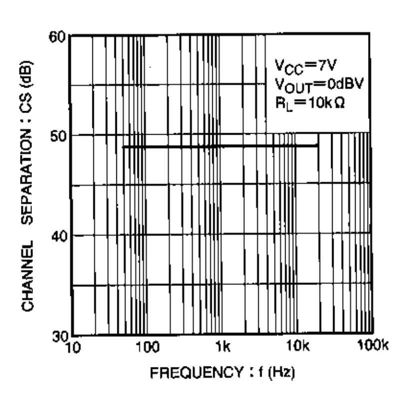


Fig. 7 Channel separation vs. signal frequency

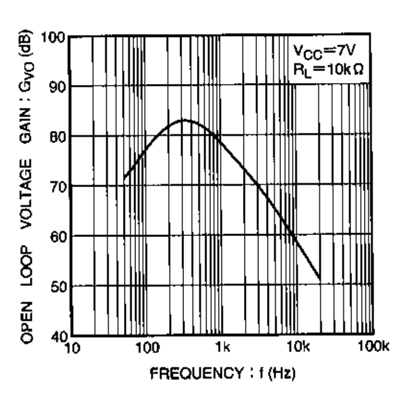


Fig. 8 Open circuit voltage gain vs. signal frequency

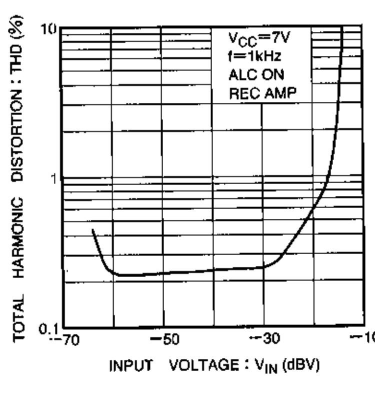


Fig. 9 Total harmonic distortion vs. input voltage

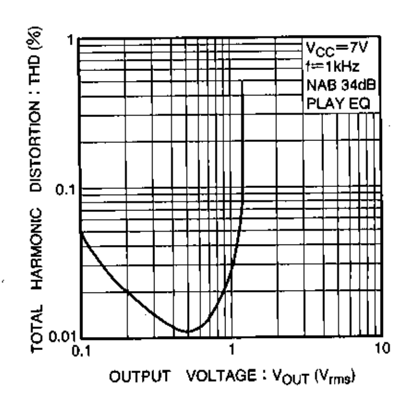


Fig. 10 Total harmonic distortion vs. output voltage

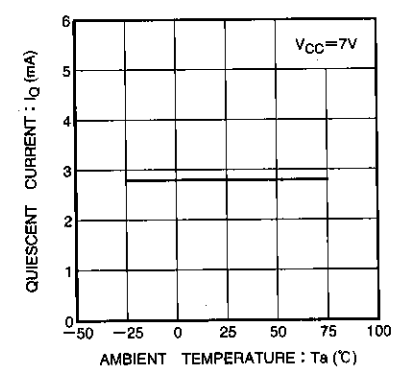


Fig. 11 Quiescent current vs. ambient temperature

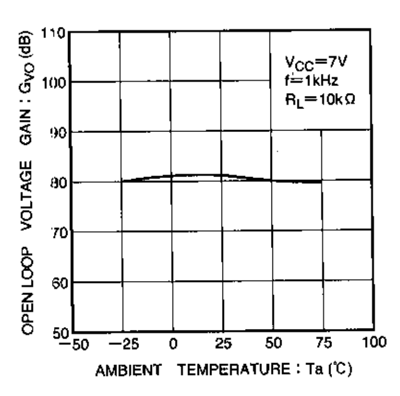


Fig. 12 Open circuit voltage gain vs. ambient temperature

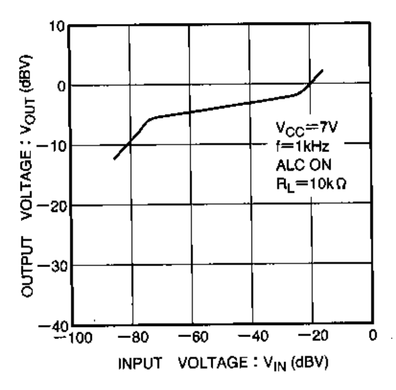


Fig. 13 ALC I/O characteristics



●External dimensions (Unit: mm)

